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Moments of Truth with Conversational Agents: An Exploratory Quest for the Relevant Experiences of Alexa Users

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MOMENTS OF TRUTH WITH CONVERSATIONAL AGENTS

An exploratory quest for the relevant experiences of Alexa users

Research paper

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Abstract

Moments of truth are viewed in marketing as the decisive moments during the customer journey that eventually shape future purchase decisions, brand loyalty and recommendations. Recently, the concept has found recognition with large tech corporations that seek to influence customer experience at the earliest possible stages of system usage. Despite their importance, moments of truth have hardly been defined or conceptualized. More importantly, few technology studies have actually applied it. By extending and deepening the understanding of moments of truth, we investigated how a customer's truth actually forms when engaging with a new technology, and what we can learn from philosophy and sociology about the phenomenon.

In a qualitative study with 30 Amazon Alexa users, we investigated truth formation over time and in memorable moments. We explored the multifaceted landscape of interactions that shape a customer's truth - interactions that play out positively or negatively because they tie specific value qualities to the agent. We also addressed ruptures in the customer journey – deeply unsettling moments of truth that abruptly destroy a previously good relationship. We argue that gradual and incidental truth formation can deliver valuable insights for system developers and provide a new perspective for the analysis of customer journeys.

Keywords: Conversational Agent; Voice User Interface; Smart Speaker; Alexa; User Experience; Moment of truth; Human Computer Interaction

1 Introduction

In 2018, Danielle, a woman from Portland, contacted a local TV station to report that her conversational agent (CA) Alexa had unnoticeably recorded a private conversation between her and her husband. Moreover, the agent had sent the recorded file to a random person from the couple's contact list without their knowledge. The recipient of said file immediately called the family to tell them what he had received. Deeply unsettled, the couple turned to Amazon's customer service, but as the company was first not available and then not able to explain the incident, they turned to the media. The indignant customer expressed her feelings: "*I felt invaded. A total privacy invasion. I'm never plugging that device in again, because I can't trust it*" (Horcher, 2018). What Danielle experienced was what we investigate in this article conceptually: A Moment of Truth (MoT) that fundamentally altered her relationship with technology.

MoTs are important in a world where truth is at stake. In recent years, the information world is separated into filter bubbles (Pariser, 2011) who seem to develop their own truths on all matters ranging from scientific research to people and products. Political institutions lament a "*fragmented reality*" in which citizens and consumers have a hard time to align with an agreed-upon truth that enables decision making (Elsberg et al., 2019). Personal truths seem to have replaced the view for a shared truth. For companies, this development is dangerous when customers go through the kind of experience that Danielle had and make it public. The brand damage is high, even if a reported incident may not be true or not the fault of the company. Companies therefore should have an interest to ensure that customers form a personal truth about new products and technologies that aligns with the true value qualities of the goods they offer (assuming of course, that their offered goods deserve appreciation).

This article explores how truth is formed around new technological products and services. Since product truth formation is a relatively novel scientific angle, we first show how truth, and specifically MoTs are referred to in marketing, philosophy and sociology. Secondly, we show how the theoretic knowledge on truth from these disciplines can be combined to understand truth formation on technology. We then apply the theory to a concrete technology on which truth formation is happening right now; that is CAs, such as Amazon Alexa. Hence, our study answers two central research questions: How do users form a personal truth about the CA Alexa in a gradual truth formation process as well as in singular moments of truth? How do these truth processes relate to concrete system dispositions of the CA as well as to value qualities of the Information System? The qualitative bottom-up analysis of truth formation that we use to answer these questions contributes a novel approach for the analysis of user experiences. In fact, truth formation is a new conceptual framework for exploring and explaining factors that impact the user experience over time. It adds a process perspective to traditional approaches that tend to remain limited to specific aspects such as usability, information architecture or user acceptance. CAs are uniquely suited to study MoTs because of their ability to delight users with their human-likeness on one side and to disappoint them on the other, just because they are less competent than customers often expect (Luger and Sellen, 2016). Furthermore, predictions suggest that 3 out of 4 households will be equipped with a CA by 2025 (Loup Ventures, 2019). Conversing naturally with CAs bears the potential to profoundly alter the relationship humans build up with information technology (IT) systems (Nass and Gong, 2000; Nass and Brave, 2005).

Our starting point to study MoTs is how they are looked at in the marketing practice, not least by Silicon Valley's tech giants (Lecinsky, 2011; Goldman, 2014). In marketing, a MoT is simply referred to as a contact point between a customer and company, which bears the potential to decisively shape the customer's relationship toward that company, its products or its brand (Moran et al., 2014; Löfgren, 2005; Carlzon, 1987). A MoT which plays out positively can be the decisive impetus for a purchase decision, brand awareness, customer retention, overall satisfaction and recommendation. In contrast, if a MoT plays out negatively, it can significantly harm the brand, lead to rejection and adversely affect the company's sales figures and reputation. MoTs are not yet unanimously defined. We will show below how marketing theorists and tech giants use the term loosely and apply it to all kinds of positive or negative customer interactions. They do this for good reason, recognizing that customers form truth perceptions around technical services over time. At the same time, philosophers like Alain Badiou have developed an event theory that allows for understanding MoTs at a much deeper and rigorous level (Badiou, 2005, 2013).

After all, what is really relevant for companies to know is whether there can be specific moments in a sequence of positive and negative customer interactions, which play out in such an impactful manner that they leave a lasting impression on the customer, and shape their future interactions with a technical product, service or brand. The difference between these two ways of thinking about MoTs is the way personal truth is building: The truth formation processes can be considered as either *gradual* or *incidental*, as we discuss below. Using qualitative analysis, we investigated the recollections of memorable usage experiences of a group of 30 users of Amazon Alexa and other CAs. It becomes clear that experienced system dispositions drive distinct value quality perceptions of the technology over time. These value qualities then jointly constitute the developed personal truth that a user builds up on the new technology. That being said, distinct and singular MoTs in the form of negative events can destroy a long history of varied experiences and radically shift customers away from the technology. The types of experience that triggers this kind of negative MoT will be analyzed below, specifically in regard to CAs.The characterization and identification of MoTs, as outlined in this article, bears significant practical potential. Memories of past interactions with technology have an impact on a user's attitude and future usage behavior (Bhattacherjee and Premkumar, 2004; Morris and Turner, 2001). Hence, an assessment of MoTs is beneficial for developers and users alike. It can crystallize potential routes to an overall more positive and valuable technology experience and subsequently foster a positive attitude and increased usage behavior.

2 Background

The term "moments of truth" was first coined in the 1980s by Jan Carlzon, the former chief executive of Scandinavian Airlines (Carlzon, 1987). In his view, every contact point between a consumer and a company bears the potential to be formative for how the customer perceives a brand and its products. According to this early definition, what turns a normal moment into a MoT is its potentially decisive character. Every experience with a brand, product or company can be such a MoT (Carlzon, 1987). Therefore, the truth an Alexa user holds about his or her CA, is a mosaic of all relevant experiences of the CA's system dispositions; from the first moment of comparing products online, to using and evaluating the system dispositions. An experience is relevant if it matters, i.e. if it has a positive or negative impact on the customer's overall opinion or attitude.

2.1 Truth formation over time

In the three decades following this early definition, marketers worked on paths to proactively identify specific points or "moments" in the customer's journey, which likely have decisive character (Löfgren, 2005; Moran et al., 2014). They developed methods to specifically target customers in these moments: standing in front of the shelf in the supermarket aisle (Löfgren, 2005), encountering customer service (Bitran and Hoech, 1990) and disposing of the product (Strong and Payne, 2019). Recently, the early phase of searching the internet (Moran et al., 2014) has gained attention as a relevant moment for customer interactions. Google started to describe parts of its business advantage as having access to the "zero moment of truth" (Lecinsky, 2011). It is described as "the precise moment when [people] have a need, intent or question they want answered online" (Goldman, 2014). Google uses the concept to praise its power to shape peoples' brand perceptions before the first direct contact with a company and, of course, long before the actual purchase decision (Lecinsky, 2011). The question that arises though, is whether a first search-result encounter with a brand on Google is really decisive and important for the customer. Will it have any influence on the personal "truth" that a customer builds up? If we stick to Carlzon's view, MoTs should matter in the long run. This implies that customers would need to remember them.

Long-term memory is enhanced by emotion and repetition (Tyng et al., 2017; Hintzman, 1976), i.e. humans are better at recalling events which they have internalized through repetition, or which they have experienced emotionally. Cognitive scientists have demonstrated in numerous laboratory studies and autobiographical studies that emotional arousal creates a specific physiological condition, which activates the areas of the brain in which memory is encoded and recalled (see for example Schacter, 1998; Hamann, 2001; Conway et al., 1994; Bradley et al., 1992). Compared to neutral events, emotional events are recalled easier, more often and with more clarity and

detail. In this context, cognitive scientists often characterize emotions on two dimensions: Their level of arousal and their valence rely (i.e. positive or negative emotion) (Russell, 2003). We argue that an experience with the CA is likely to play a larger role in personal truth formation if it is either connected to an emotionally laden experience (such as a joyful family dinner with Alexa games) or re-enacted frequently (such as a repeated failure to play a favorite playlist). Therefore, we will study truth formation in the empirical part of this paper in regards to retrospectively remembered moments that are present in memory and are emotionally loaded. Experiences, which our study participants recall with apparent emotional arousal, will be examined for cues to emotional intensity and valence. We reason that customers are building up their personal truth about a new technology over time, and that it is the emotionally loaded and frequently repeated experiences of system dispositions that make up what matters for them.

2.2 Specific 'moments' that shape truth

Looking at the term, "Moment of Truth" in more detail, shows that despite the long-term notion of truth itself, there is also the "moment" aspect here. In our daily lives, we humans flow gradually from one moment to the next. Most moments we perceive seem stable. Sometimes however, this flow is interrupted. The MoT can be read as an interrupter of the ordinary flow of moments; marking the breakpoint from ordinary to special, and creating a lasting memory in the person's mind. The modern philosopher Alain Badiou has offered substantial insights to discern such breakpoints. In the event theory he developed, he distinguishes meaningful events from the neutral state of being (Badiou 2005, 2013). He identified three characteristics of *events* that discern a decisive moment from an ordinary one. According to his work, a MoT should possess three characteristics:

- It should create new perspectives and inspire people to reorient themselves or change their behavior, and/or their whole lives (Badiou, 2011, p.92-93)
- It should open up new opportunities, which in effect can change reality (Robinson, 2014).
- It can be defined by assessing its impact and consequences. Therefore, it cannot be foreseen, it can only be defined in retrospect (Lecercle, 1999, p.8).

The introductory example of Danielle aligns very much with Badiou's event definition. She experienced a single, shocking incident which changed her view on CAs entirely. What she held to be true, was replaced by a new truth within seconds. If we understand MoTs in the way Badiou's event theory suggests, then this would enrich the understanding that marketing currently has of MoTs. It suggests that customer experiences do not only gradually add up to form a personal truth, but that there are also MoTs which are radical turning points in the customer journey. This path is also one suggested by sociology, concretely described in the concept of moral shocks (Jasper, 1999). Jasper reviewed how moral outrage forms in people and leads them to participate in protest movements. A moral shock can emerge abruptly, due to an unexpected event, and this one incident can be the decisive impetus for people to start protesting. This process appears to be analogous to the idea of a MoT as one decisive, formative incident. Nevertheless, Jasper also paints a second path to protest behavior. Moral outrage can also evolve and build up over time. There can be a long period during which a person is confronted with a dissatisfactory situation or development. This period can culminate into a turning point that may have been meaningless by itself. Yet, as it stands in a row with many previous experiences, it marks the point where the individual becomes inclined to take political action.

In this sense, a MoT can also be described as a gradual realization. An undramatic, in itself insignificant piece of new information can suddenly be the "last straw", the last experience necessary to finally motivate a person to take action. Against the background of these momentary event theories from philosophy and sociology, we hypothesize or reason that customers not only form their personal truth on a technology gradually over time, but also through sudden events, which either come as an unprepared surprise or as a last straw in a longer chain of events. As a result of these events, they radically alter their perception of a new technology from one day to the next.

3 Methodology

Participants - We engaged 30 subjects, who identified as regular users of an Alexa-enabled device to participate in a qualitative research study on truth formation and MoTs. 8 participants (27%) were recruited through Austria's biggest national online news portal called Standard.at. They were invited to participate in a study on CA usage upon reading a blog about various interactions with Alexa. In addition, 22 participants (73%) were recruited via email sent to university students with various backgrounds in economics, management, information systems and sociology. Study participants were invited to share their experiences with Alexa in focus groups in the context of a research project investigating the interactions with CAs.

Before starting the focus group sessions, we conducted one-to-one interviews with five participants who were selected as a high variation sample (Marshall, 1996), seeking diversity of CA use contexts (family with child, visual impairment, extensive smart home, Airbnb) and systems (Echo, Echo Dot, Firestick, usage of several different CAs). From these participants, two were female and three were male, aged between 22 – 67 years. We started data collection with in-depth interviews, in order to explore the diverse nature of user experiences in very different usage contexts. This allowed us to concretize questions and prepare a moderator guide for the focus group sessions that would be able to cover diverse experiences and usage patterns. The combination of methods allowed us to take advantage of the potentials of each method. One-to-one interviews have the advantage that they allow detailed discussion of an individual's experiences, with room for follow-up questions. Individual interviews are suitable to explore and discuss the fine details of an individual account, in depth and without time constraints. In contrast, focus groups have the advantage that the participants can react and build upon the accounts of others (Langford and McDonagh, 2003). Particularly the investigation of complex behaviors and motivations is fostered by focus group discussions, because group members tend to query each other and explain themselves to each other ("group effect", c.f. Carey, 1994). Under the premise that potential risks related to focus groups are mitigated, such as polarization effects (Morgan, 1996, p.140) or inhibition of participants (Langford and McDonagh, 2003, p.5), they are an effective tool to gain large amounts of information from a number of people. After the individual interviews, 25 participants were invited to 6 focus groups on the Amazon Alexa system. Similar to Amazon Alexa's market user base, our sample was skewed towards male millennial (Koksal, 2018; Morning Consult, 2018). 72% of focus group participants identified as male. The users were aged between 18 to 57 years old, with a median age of 23 and a mean age of 27. The study design was formally approved by the university's ethical committee. Information about the planned study, research goals and confidentiality of personal information was sent to participants in written form in advance.

Procedure – The interviews had the purpose of openly exploring context-specific CA usage experiences and the meaning participants attribute to them. We initiated each interview with simple questions about usage behavior (frequently used functions, habitual interactions with Alexa, etc.). Thereupon, the attitude towards the CA was discussed, along with the specific moments that had formed the participants' views, and the emotions that may have been evoked by these moments. Further questions such as perceived risks and trust in the agent were spontaneously discussed. The interviews were semi-structured and on average lasted 62 minutes. The interview sessions allowed us to identify which questions would work best to engage participants in describing gradual truth formation, change of usage, memorable singular moments, as well as most formative experiences. The interviews prepared us for the six focus groups we conducted over a period of three months between September and November 2018. A detailed moderator guide provided the structured procedure for every session. Focus groups were initiated with an explanation of the tools and techniques to be used, and with the clarification of simple but strict communication rules. Participants were asked not to interrupt each other and instructed that any opinion and details were legitimate and worthy of discussion. These instructions aimed to minimize the risks of inhibition and polarization effects. After the sessions, group members were debriefed and handed a financial compensation for their effort. In the focus groups, we discussed specific moments that formed the participants' views and the perceived advantages and disadvantages that may have been evoked by their CA in these moments. A brief introductory round, in which the participants discussed how long they have had a CA and in which situations they mostly used it, served as

icebreaker. As a second task, we performed a "Round-Robin Questionnaire", a technique that proved to be particularly thought-provoking and suitable. Each participant was handed large paper sheets on which the beginning of a sentence was written, such as: "*I will never forget how Alexa…"*. Participants were then instructed to complete the sentences with what they thought was the most appropriate answer and hand their sheet clockwise to their neighbor. After all the participants had completed all of the sentences, the sheets were hung up and jointly discussed. In the third block, the group members were engaged in a story-telling activity. A flipchart with different keywords was displayed and participants were asked to recount an incident with their CA, or to share their thoughts related to one or more of the presented keywords *(i.e.: "expectations", "everyday life", "media consumption", "purchases", "communication", "surprise"*). Wherever suitable, discussions were rounded up by the question whether experiences had led to any lasting changes in the use of the CA and whether the participants had other similar experiences. On average, a focus group lasted 83 minutes.

Data collection and analysis - Interviews and focus group sessions were audio taped and led to verbatim transcriptions of 74,144 words. ATLAS.ti, a software package designed for the analysis of qualitative data, was used to help generate themes with inductive thematic analysis (Creswell, 2013, p.148-152). The authors developed a first codebook including descriptive codes, magnitude and affective codes (Saldaña, 2009). With the help of two additional independent coders, the codebook gradually evolved. In an iterative process, codes were discussed, transcripts were coded independently, discussed again and recoded. Figure 1 contains an overview of how the transcribed material fed into thematic codes for over 400 relevant incidents, which were related to system dispositions experienced by CA users. The figure depicts how frequently each system dispositions was mentioned (unique mentions, *n*), and how emotionally they were discussed by participants (emotional valence, *EV*). Both of these indicators likely to drive positive or negative truth formation. Affective coding and magnitude coding were used to generate the supplemental alphanumerical indication of emotional valence of the unique user experiences and the system dispositions they relate to (Saldaña, 2009; Weston et al., 2001). Three levels of emotional valence were identified, depending on the specific formulation used by participants. On the lowest level were simple indications that an experience of a system disposition was either positive or negative (numerically coded as + 1 or - 1. Such an indication was also used as the threshold level for experiences to be considered at all as relevant for truth formation. The second level emotional valence was found when participants hinted to the strength of a positive or negative experience using words like "much", "very", "quite". We then coded the emotion as either +2 or – 2. Third level valence was indicated by strong adjectives such as "extremely", "totally", "completely", coded as +3 or -3. The reliability of valence direction and strength was assessed by measuring intercoder agreement (ICA) between three coders. Agreement on the interpretation and application of codes for system disposition experiences lead to a Holsti Index of 82.1%, indicating a broad overlap of coded text (Holsti, 1969). Krippendorff's Cu-Alpha coefficient affirms the ICA in the multi-valued assignment of thematic, affective and magnitude codes to semantic domains ($_{Cu}\alpha$=0,853) (Krippendorff et al., 2016). What emerged in this analytical bottom-up process was that the individual experiences of system dispositions could be thematically grouped. We found that they often shared a common core around a specific value quality. For example, new CA commands may be a system feature or "disposition" that a user witnesses. Yet, what really counts for the user's personal truth is not necessarily a specific new CA command, but the value of newness that is emotionally associated with it. In other words: even if a user does not look into each new command separately, he or she will still perceive the value quality of newness as the CA operator keeps adding new skills. Equally so on the negative side of experiences: When a user frequently witnesses Alexa activate without being prompted, then a user perceives the negative value quality of disturbance or interruption. In line with Material Value Ethics (Scheler et al., 1973), it was possible for us to align the many emotional experiences collected on concrete system dispositions with a smaller number of positive or negative value qualities. We postulate that these value qualities jointly constitute and add up to the *truths* that CA users form around the new technology. The grouping of emotional system experiences around certain value qualities allowed us to capture truth formation through feature experience, and to identify the greater themes of meaning-contents that drive users' personal truth about CAs.

Figure 1 illustrates the individual truth formation around CAs as a result of many experienced system dispositions that cater to different value qualities and assemble the overall appearance of the CA. A particular system disposition experience can impact several value qualities at once. In order to create structure and validly attribute system dispositions to overarching value qualities, we performed a card-sorting exercise (Nawaz, 2012). A small group of 5 subject experts from the fields of technology, ethics and user-centric design individually performed hybrid card sorts with *usabilitest*, a common online tool for usability testing. Predefined value qualities were provided but participants were allowed to create additional categories that they thought were missing. The exercise allowed us to group and merge value qualities more reliably and to rename categories where it seemed appropriate in order to reduce ambiguity. In our presentation of these interaction types, we provide original quotes to illustrate the most mentioned and the most emotional distinct interactions, and align our findings with prior research.

4 Results

The first level of thematic analysis led to the identification of 498 incidents, which were potentially relevant for truth formation. We excluded those that did not relate to a specific CA system disposition, such as interactions with the customer service, CA pricing, etc. The remaining 445 incidents were clustered into 46 positive and 47 negative forms of typical system disposition experiences. These could again be related to 23 value qualities (11 positive ones and 12 negative ones). After reviewing the many interactions which gradually shaped our participants' truth of their CA, we turned to two instances of instantaneous truth formation. We separately analyzed the experiences of two participants who reported a turning point which caused them to abandon their device. We compared their discussion focus and emotionality with that of the entire group of participants to find conclusive patterns.

4.1 Positive experiences and value qualities

In our presentation of results, we focus primarily on the most discussed interactions, and the most emotional reports. We identified 164 positive incidents with 11 value qualities.

Physical and cognitive convenience - The most discussed system dispositions were those related to convenience. The benefits of using one's voice to do things that formerly required physical or cognitive effort was huge (65 mentions). The CA enables users to perform these activities quicker, easier and often remotely. *"When I am lying in my bed, the light switch is relatively far and that's why I connected the lamps to Alexa. So I can lay in my bed in the morning and control my lamps."* (FG5). In some cases, the facilitation of cognitive and physical tasks can become indispensable in the daily routine: *"These are advantages I wouldn't want to miss anymore."* (FG5). So far, our findings confirm recent studies, which have pointed to the satisfactory experience of hands-off control of devices and features (Sciuto et al., 2018; Cowan et al., 2017). A new aspect is the distinction between physical and cognitive convenience. **Joy** is the third most discussed value quality of our sample. Most users recalled that they adopted the CA playfully by testing out its functions; personalizing Alexa's skills and asking "funny" questions to see how Alexa would react: "*In the beginning it is fun to play around with it, everybody who has Alexa and invites guests knows that for sure. But after a while you just want it to do the things you bought it for and not some senseless gimmicks"* (FG5). This confirms Luger and Sellen (2016) who suggested that curiosity and playfulness drive initial Alexa adoption and the process of getting to know the assistant. Beyond the initial phase of adoption, we found that "fun" functions such as making Alexa sing, rap, mimic animal sounds, tell jokes or play games, are mostly recurred to in the presence of children and visitors: "*It's an icebreaker, somehow. You say Alexa, guest reception […] she greets and welcomes the people and makes ironic comments. It's really funny*" (FG4). Our findings confirm prior suggestions that CAs can cause the emergence of new fun family rituals (Beirl et al., 2019). For participants who owned further multi-functional smart home appliances and used Alexa as a central control hub, demonstrating the home to visitors became a central aspect of their experiences. Sciuto et al. (2018) suggested that introducing Alexa to guests can be a positive experience of pride. Our findings add to this notion that the technology can serve to identity formation; i.e. being seen as a pioneer in a futuristic, technologically enhanced home. "*Since we have upgraded our home with Alexa and the smart home devices, when we have guests, the first thing they want is a tour through the apartment. So we go around and show them how they start the scenes, the music, TV and so on."* (FG2).

Negative truth formation	EV	n
Lack of functional quality	**-1,38**	**50**
Some skills are badly integrated or too complex for effective voice control	-1,29	*24*
Alexa doesn't understand the user in various situations	-1,37	*19*
Cannot be used to make calls	-2	*3*
Alexa suddenly forgets the favorite radiostation	-2	*2*
Default setting of language and timezone are wrong or change spontaneously.	-1	*2*
Lack of naturalness	**-1,25**	**45**
Conversation is not natural: commands have to be precise, short, not complex.	-1,47	15
Alexa lacks spontaneity: Standardized and repetitive replies	-1,29	7
Alexa requires user to speak dialect free, Austrians have to use German idioms	-1	6
User has to speak unpolitely, in loud, commanding voice, like a robot	-1,4	5
Context is forgotten, user has to constantly repeat it	-1	5
Alexa has a weird pronounciation of uncommon words	-1	3
Some words have to be pronounced strangely to be understood	-1	2
Alexa speaks unemotionally, robotic, not smooth	-1	2
Unease of use	**-1,57**	**41**
Set-up and configuration of Alexa and skills is complicated for non-experts	-1,27	12
Control is not as smooth and trouble-free as advertised	-1,4	10
Operating Alexa requires learning and time	-1,89	9
Alexa app doesn't run smoothly, is complicated, unintuitive, no fun to use	-1,75	8
Choosing media or articles via voice is problematic for long titles and descriptions	-2	2
Disturbance / interruption	**-1,40**	**35**
Alexa activates unsolicitedly (often interrupting conversations)	-1,42	24
Alexa utters unnecessary, lengthy monologue or beeps.	-1,44	9
A bright red light activates when Echo is muted, prevents user from muting	-1	1
Alexa plays ad for 'Music unlimited' if song is not in library	-1	1
Lack of agent competency	**-1,42**	**29**
Alexa doesn't know the answer or doesn't answer at all	-1,55	12
Alexa does something different then requested	-1,25	8
Alexa puts items into shopping cart or orders them	-1,5	5
Replies to knowledge questions are too short	-1,5	2
User dislikes the music or stories Alexa suggests	-1	2
Lack of privacy	**-1,13**	**24**
User is concerned about whether Alexa is eavesdropping	-1,3	10
User is concerned that data is shared with public authorities or third parties	-1	6
User is concerned about what provided data could reveal	-1	5
Alexa arbitrarily sends wish lists to friends	-1	2
User operates Alexa increasingly unconsciously, looses track over disclosed info	-1	1
Passiveness	**-1,29**	**14**
User fears that passive consumption of suggestions narrow his/her horizon	-1,5	6
User's convenience and comfort start feeling like lethargy and dependence	-1,17	6
User fears unlearning basic cognitive skills	-1	2
Manipulation	**-1,21**	**14**
User has unease about being nudged or manipulated	-1,25	12
Alexa steers user to mainstream music	-1	1
Alexa appears to steer user towards AmazonBasic products	-1	1
Lack of hardware integration quality	**-1,75**	**8**
Interruption of connection to internet, bluetooth or devices	-2,2	5
Malfunctions after updates or after unplugging	-1	2
Reboot after unplugging takes too long	-1	1
Lack of transparency	**-1,63**	**8**
Unclear where recordings are stored, deleted or turned off	-2	4
User cannot check what "really" happens to personal data	-1,25	4
Lack of trustworthiness	**-1**	**7**
User doubts whether muted microphone is really off or reactivates itself	-1	6
User doubts whether deleted recordings are really gone	-1	1
Lack of customizability	**-1**	**6**
Alexa doesn't learn and personalize as much as expected	-1	5
Wakeword and commands cannot be personalized	-1	1

ORIGINAL TRANSCRIPTION OF FOCUS GROUPS AND INTERVIEWS

Positive truth formation		
n	EV	
33	**+1,27**	**Physical convenience**
21	+1,3	Voice control of all connected appliances
4	+1,3	No need to use hands
4	+1	No need to stand up
3	+1,3	Control devices remotely from outside of home
1	+1	Remote check if devices are off
32	**+1,22**	**Cognitive convenience**
9	+1,1	Quicker and easier access to content
7	+1	Easy access to daily news, sports, weather etc.
6	+1,3	Serves as encyclopedia, reference work and for fact checking
4	+1,5	List function
2	+1	Convenient look up of information
2	+2	Mathematical questions
1	+1	Conversion of measurement units and currencies
1	+1	Get suggestions to facilitate decision making
24	**+1,29**	**Joy**
8	+1,3	Wishing for music
5	+1,6	Icebreaker in groups, fun for visitors
4	+1,5	Alexa can tell jokes, sings and raps
3	+1	Amusing responses and reactions
2	+1	Games and Quizzes
2	+1	Mimicking animals / fart noises
15	**+1,40**	**Ease of use**
9	+1,3	Easy way to set reminder / Alarm
4	+1,5	Once commands are learned, control is easy
2	+1,5	Alexa presents or explains new skills and functions
10	**+1,70**	**Comprehension quality**
6	+1,8	Echo understands commands from far away
2	+1	Echo understands commands when music is on
1	+3	Alexa understands users with a dialect
1	+1	Echo understands whispering
10	**+1,30**	**Inclusiveness**
4	+1,3	Creates accessibility for users with visual impairment
3	+1	Access to modern technology for elderly
2	+2	Clears a hurdle for less tech-savvy users
1	+1	Creates accessibility for users with restricted mobility
10	**+1,30**	**Hardware integration quality**
3	+1,7	Good sound quality of speaker
3	+1,3	Integrates many different devices, apps and functions
3	+1	Easy coupling with smart home
1	+1	Multi-Room - control several smart speakers at once
11	**+1,27**	**Newness / Variation**
5	+1,4	Varying content of good morning routine
5	+1	Frequently new commands and skills
1	+2	Special alarm sounds
8	**+1,88**	**Naturalness**
3	+2	Speaks human-like, not like a robot
3	+1,7	Reacts humanly to insults
2	+2	Humanly exchange of polite phrases, greeting
7	**+1,29**	**Enrichment**
4	+1,5	User listens to more music, news or podcasts overall
3	+1	Sometimes unexpectedly detailed knowledge
4	**+1**	**Customizability**
1	+1	Brief mode activation for less disturbances
1	+1	Learns preferred radio stations
1	+1	Picks songs up where they were interrupted
1	+1	"Routine"- functions facilitate access and control

n = Number of unique mentions
EV= Emotional valence

Figure 1 *Negative and positive truth formation – overarching value qualities and subordinate system dispositions, ranked by number of unique mentions. The three most emotionally discussed value qualities are marked yellow.*

Naturalness - The most positive emotional discussions emerged when participants brought up situations in which the agent was perceived as human-like. For example, three users positively emphasized the pleasant natural timbre and flow of Alexa's voice, and three appreciated situations in which they exchanged polite phrases and greetings with Alexa as if they were talking to a human being: *"Alexa is sympathetic and nice. I always say thank you to her because I like how she says 'you're welcome'"* (I2). The sympathy for Alexa could go so far that the assistant was missed "*like a family member*" when it was not "*sitting*" on the table during breakfast (I3). Prior studies have pointed to the positive experience of finding a companion in Alexa (Purington et al., 2017; Lopatovska and Williams, 2018). Cowan et al. (2017) report that users generally perceive human-like features of the voice positively. It is noteworthy, that human-likeness appears to foster distinctly positive user experiences, creating highly emotional positive memories that contribute significantly to an overall positive personal truth. **Comprehension quality -** We found that participants perceived it as very positive when the agent comprehended them surprisingly well, particularly, when they were speaking towards a different direction, whispering or speaking in a dialect: *"I can stand anywhere in the apartment and speak, it always understands me."* (FG1); *"She understands me from a distance, she understands the words I say, she understands anyone, even if the music is turned on. I was really positively surprised."* (FG3). This unique system disposition (enabled by far-field voice recognition technology (Lu, 2017) significantly enhances the user experiences. If the agent is able to recognize and understand speech, even if it is muddled in other sounds or comes from a distance, it becomes easier to control by users. This suggests that control may be a deeper underlying value that a good comprehension capacity of the CA can create. **Inclusion -** A special case of experience was identified in ten statements of users who described that the assistant made modern technology more accessible and inclusive to specific user groups. Specifically, the voice interface was seen as clearing a hurdle for less tech-savvy persons, elderly persons, users with visual impairment or with restricted mobility. Discussing his grandmother for whom he had recently bought a smart speaker, a participant of FG2 notes: *"I believe she generally gains autonomy because she cannot move but she can talk […] with Alexa, she can control music, radio, news, audio books, lamps, make calls and ask for the time"*. This suggests that the value quality of inclusion fosters important underlying human values such as autonomy, freedom and independence.

4.2 Negative experiences and value qualities

We identified 281 negative system dispositions which have been related to 12 value qualities.

Lack of functional quality – A frequent source of frustration was when functions that users expected to work smoothly, repeatedly caused errors, such as the control of the popular third party application Spotify (issues with this application alone were mentioned 13 times). *"For me, the connection to Spotify was very important. […] I wanted to add songs to playlists with voice commands. That's what I saw in the Alexa advertisement and I bought it for that. It would have been the most important function but unfortunately I just cannot make it work."* (I1). It appeared to be the feeling of just not being able to make the CA function the way it "should", which lead to feelings of anger. Our study participants vividly discussed different types of (often recurring) interruptions of the trouble-free functional flow they had expected. These discussions, emerging independently during several focus groups and interviews made this category the most discussed value quality of all. **Lack of naturalness** – A frequently mentioned theme was that users felt the system did not adapt to them enough and complained that they had to adapt in order to use it. Four study participants complained that they could not modify commands and were forced to learn the exact wording. Interestingly, this wording appears to be based on German idioms, to which Austrians have to adapt in certain cases: *"I realized that when I say 'Alexa, turn on the light', it doesn't work, but when I say 'switch on the light' it works."* (FG5). Frustration over the lack of context memory and the obligation to constantly repeat context to Alexa was mentioned five times: "*…and then I asked directly 'how old is he?' and it didn't work. I had to repeat the name, and then I got an answer. She cannot answer follow-up questions, that's the disadvantage*." (FG3). Users also disliked the way in which they felt they had to talk to their voice assistant so it would understand them better: "*in short chopped sentences*" (I2), "*without please or thank you*" (FG1) and in a "*rude commanding tone*" (I1). Several authors have suggested that the real world's complexity and multiactivity are not yet reflected in voice interface design, hence requiring considerable work on the part of the users, especially in early stages of

usage (Reeves et al., 2018; Luger and Sellen, 2016). In the overall context of truth formation, our analysis suggests that system dispositions, which relate to the value quality of naturalness are generally of great importance. On the negative side, system dispositions that harm or inhibit natural interaction with the agent were intensively discussed across all focus groups and interviews, on the positive side, incidents that pointed to natural interactions with the CA were among the most emotional incidents discussed by our participants. Improvement of the agent's naturalness could trigger memorable positive user experiences and reduce an important part of negative perceived system dispositions. **Disturbances -** We identified a number of negative interactions in which the agent interrupted and disturbed users. With 24 unique mentions across all interviews and focus groups, the fact that the CA activated itself without being prompted, was one of the two most mentioned distinct negative system dispositions overall. Our participants described in detail how their CA interrupted conversations, movies and night's sleep. In several cases, unsolicited "awakening" of Alexa caused users to mute, unplug or even abandon the device completely. Group discussions revealed a common reoccurring unease about smart speakers, i.e. the assumption that Alexa was *"constantly listening"*. This idea was often fueled by experiences of unsolicited activation. Although the value qualities privacy and disturbances were kept separate here, this is an important overlap, which is symbolic for the individual way a personal truth is formed. For some participants, unsolicited activations merely represented an annoying side-effect of ill-conceived speech recognition technology. For others, they were frightening incidents of the agent taking on a life of its own, intruding their private space and solitude. Also, incidents in which Alexa uttered unrequested explanations were found annoying: *"At some point you start insulting her […] because whenever you couple a Bluetooth device via voice command she tells you for 5 minutes what else you could do now"*(FG2). **Unease of use and lack of agent competency** - Our participants became angry when they discussed incidents in which the interactions caused waiting times or inefficient back and forth between user and agent: *"You express clearly what you want. Then you get a reply and it's like no... In no way has this anything to do with what I just told you […] finally, I say 'Alexa, stop' and just grab my phone and do it myself"* (I1). Communication breakdowns or "*interactional trouble*" (Reeves et al., 2018, p.48) are an issue which has found much attention in recent CA studies. Communication breakdowns include situations in which a command is inexplicably not understood or misunderstood by the device, as well as the failure of the CA to utter responses that give hints as to how the situation could be solved (Reeves et al., 2018; Beneteau et al., 2019; Porcheron et al., 2017). This aspect has been found to be particularly frustrating for children (Beirl et al., 2019; Sciuto et al., 2018). Some research has already pointed to a consequence of this lack of competency: the CA is not trusted with complex or important tasks (Cowan et al., 2017; Luger and Sellen, 2016). Our findings draw a further distinction between two types of communication breakdowns by investigating how they are represented in the personal truth of the users. The first group of breakdowns is related to system dispositions that are not easy to use such as complex skill configurations or cumbersome voice control in specific situations. This group shares the user's perception of being confronted with a complicated task, that he or she may overcome alone, when learning how to operate the system. For these dispositions, the users tended to seek responsibility for the communication breakdown in their own behavior. The second group of communication breakdowns relates to a perception that the CA itself is incompetent, here system failures and breakdowns were clearly blamed on the agent.

4.3 Gradual truth formation

It appears that these experiences gradually add up to a whole picture, the individual truth of the agent. Figure 2 depicts the frequency with which a specific category was brought up in discussions, and the emotional valence which we derived from vocal triggers used by participants. The illustration clearly shows that the experiences most frequently brought up are not necessarily those which are most emotionally described. Against the background of our theoretical discussion, the value qualities which are most frequently mentioned and/or most emotionally discussed, deserve our attention. We argue that these qualities have the most impact on the individual truth. All participants reported positive and negative experiences and we suggest that the individual truth a customer holds is constituted by all of these experiences. We also found evidence of experiences gradually "stacking up", to a point where they tilt the overall truth and result in behavioral changes.

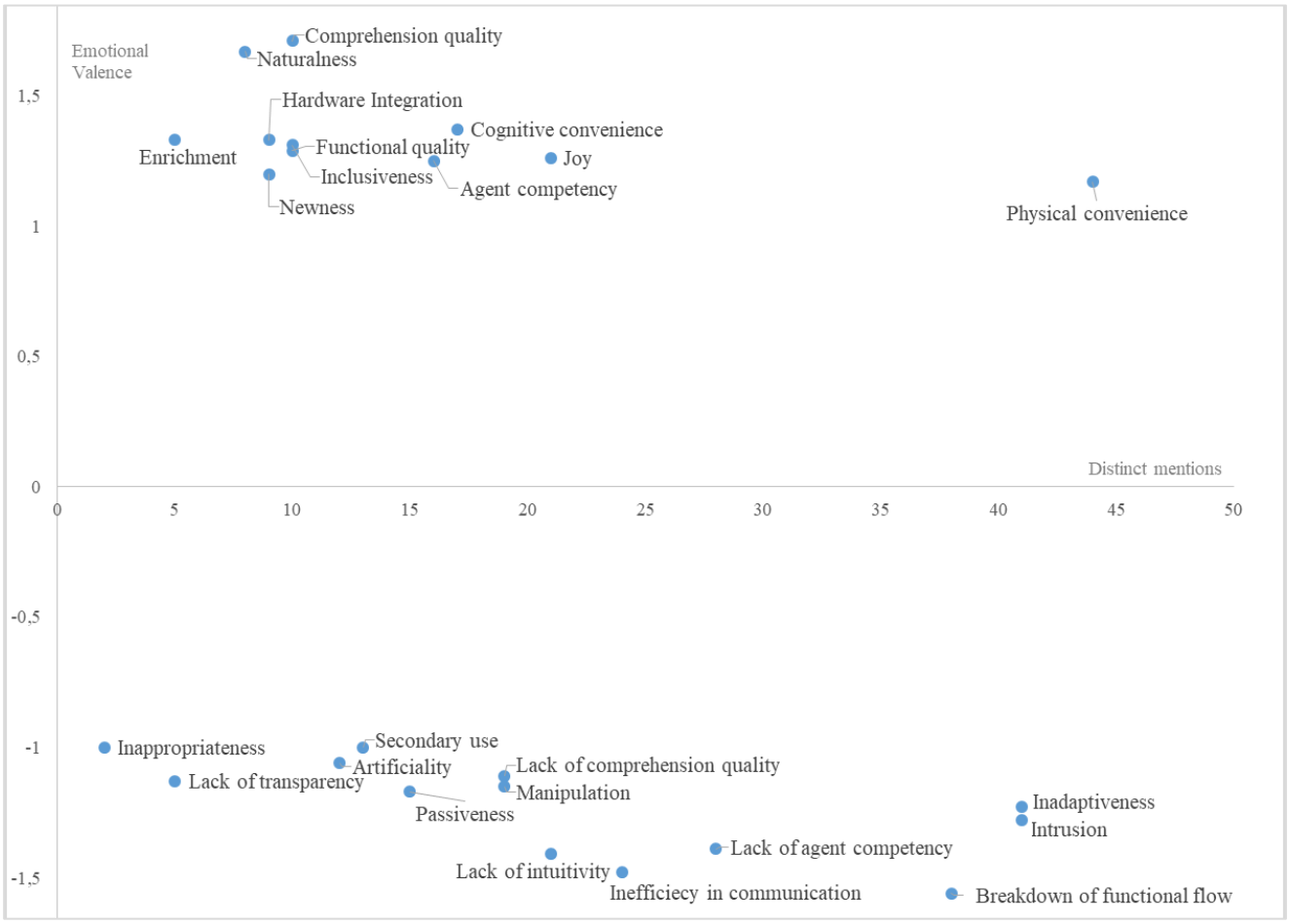

Figure 2 Frequency of mentions and emotional valence for all 30 participants

This dynamic evolved in both directions – positive and negative. Interview participant 1 recounted: *"I think, in general, I am very tech-savvy and I get myself into things, I read the settings and the extended settings, and I like to personalize things. But the desire to personalize is nipped in the bud by Alexa again and again. I recently deleted the app, as I was unnerved because there is no dealing with it."* The repeatedly encountered unease of use gradually stacked up, overshadowed other positive user experiences and finally lead this participant to not use his CA regularly anymore. Truth formation over time is an observance of particular importance for future research into user experiences: this unique perspective allows us to access how the user experience of a particular system disposition can gradually change, over a long period of time. We also found positive experiences "stacking up" and being able to create spill-over effects to the corporate brand. A satisfied participant in focus group 6 noted that his overall satisfaction with the CA lead him to gradually purchase more products from Amazon: *"I am satisfied with Alexa, and therefore also with Amazon as its producer. Since I have Alexa, I also bought the TV Stick and the Fire Tablet."* (FG6) Another participant of FG6 noted: *"I am sinking into the Amazon Ecosystem"* and goes on to explain: *"I just see how much I order from Amazon […] For example, this year after half a year, I had as many orders as in the entire year before. And last year it was the same."*

4.4 Moments of truth

We identified two instances of sudden, incidental truth formation in our sessions. Both participants have stopped using Alexa completely. This form of truth formation is distinctly different from the gradual process described

before, as participants pointed to one particular instant, which radically changed how they saw their CA. We chose to separately analyze the overall perception of truth for both participants. Since one case was described in an interview and the other during a focus group, we can present a much richer picture of the first case – overall, we identified 50 relevant interactions from the first case and 10 from the second.

Case 1 - S. described a string of negative interactions, which ultimately lead his customer journey away from his CA. He notes: *"I distanced myself from Alexa because of a variety of functions which were confusing or annoying to me."* He discusses reoccurring concerns about intrusion, secondary data use and manipulation: *„… Alexa reacts to random signal words and takes a life of her own. For example, I would find orders in the shopping cart or somehow my wish-lists were sent to friends who also have Amazon Prime. Simply because the setting options of Alexa are not well defined."* S. continued to describe his customer journey, noting that the fun factors that entertained him in the beginning gradually lost their appeal: *"The problem was, it was only funny in the beginning. Then it became a little annoying because it was less helpful, for example, when Alexa just didn't recognize the language. And then that factor of playing around just declined."* Over time, S. not only found Alexa less entertaining but also observed that his habit of letting Alexa take decisions for him more and more felt like passivity and loss of autonomy: *"It's not an assistant anymore, it's a dictator […] It is a gradual process. It is so convenient and you grant it more and more freedoms. And Alexa has really internalized my habits. Like when I watch videos, which movies I see or which kind of movies […] at some point you don't search or read reviews anymore. You just trust Alexa blindly and watch what it suggests*". Finally, S. describes one specific incident, which was the last straw that ultimately lead him to not use Alexa anymore: "*I bought a new Epson […] printer and in that time I also privately talked about a different printer from brother. And by total coincidence, suddenly that exact printer was listed in the bottom of the app, below my search history, as something that might be interesting to me. And since then I distanced myself from Alexa, because that was too spooky*." The matrix of his mentions and emotionality shows that S. is not generally more negative. He discusses positive interactions, such as naturalness and convenience, with a similar emotional emphasis as the other participants But it becomes clear, that the specific interactions that really changed his overall transcendent truth (here in a yellow circle) of the CA are mentioned more and discussed more emotionally.

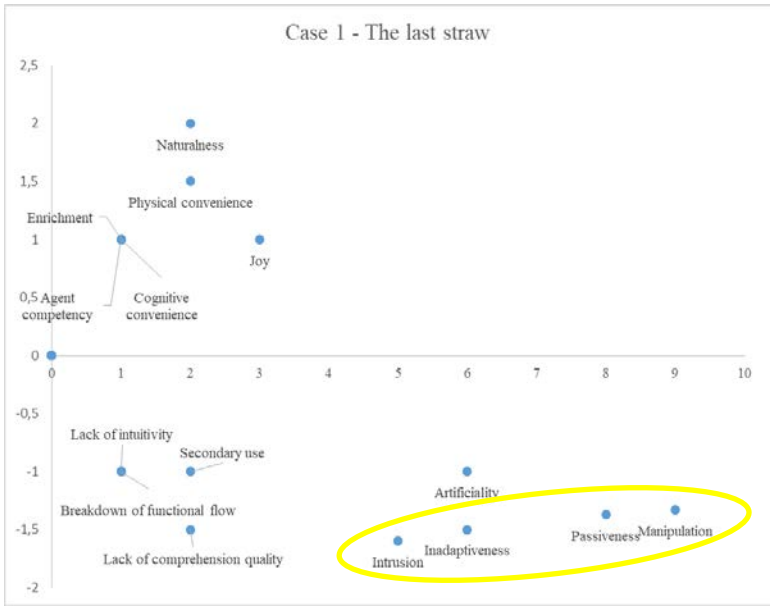

Figure 3 Frequency of mentions and emotional valence for interview participant S.

Case 2 – Our second moment of truth was reported by participant D. (FG 4). While she briefly described hands-free convenience and the initial phase of adoption as enjoyable, D. soon shared an experience which abruptly ended her good relationship with Alexa. *"I will never forget how Alexa scared me. […] She just activated as I was home alone. We live in a relatively big house and Alexa stands in the living room and my room is not directly there, it is on the floor above. When she just switched on, I thought ok, somebody must be in the house, somebody must have*

made a noise and she heard that and somehow reacted…" The incident was highly emotionally-loaded, as D. further described: *"…from then on I just unplugged it when I was alone at home, because I was afraid of it"*. In D.'s description of the incident, she shifted from referring to Alexa as a person ("she") to an object ("it"). This change is symbolic for a number of other consequences that this incident appeared to trigger: *"I had fear of, maybe it listens and records… maybe someone outside knows what I am doing or can somehow activate it from outside… I got all kinds of funny thoughts…. uhm… and I don't believe they are unfounded. Because she does record everything. And you don't know where the data goes […] Yes, therefore, it is more like a shock to me. I am somehow still in this state of shock."* D.'s incidental moment of truth experience is encircled in yellow in the graph.

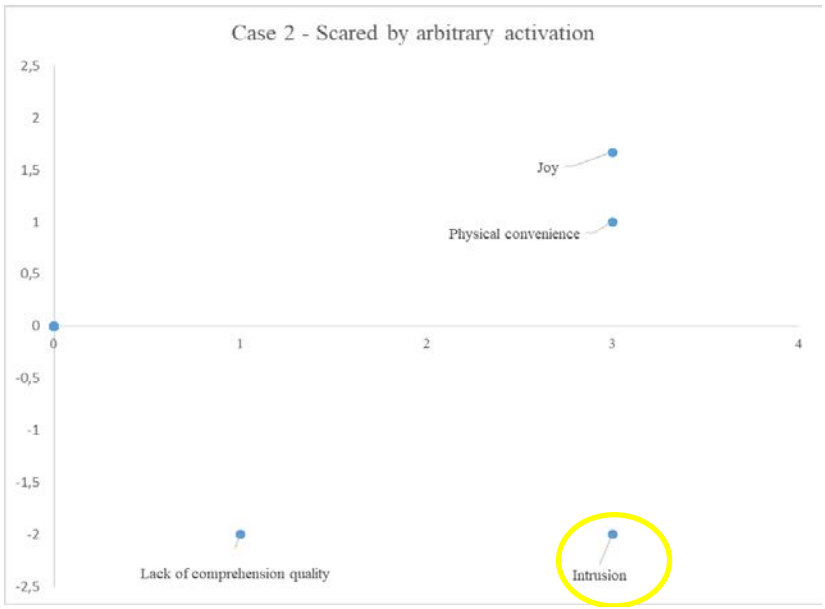

Figure 4 *Frequency of mentions and emotional valence for FG4 participant D.*

In both event-like moment of truth manifestations, we can observe the three defining statements, which according to Badiou theoretically distinguish events from regular state of being: First, there is an incident of importance, marked by a sudden rupture in the experienced reality. Secondly, this incident brings changes and causes dramatic reconsideration of one's truth perception. Thirdly, the moment gained importance through the consequences it entailed. It was in retrospect that the incident became meaningful because of the changes it triggered.

5 Discussion

The overview of interactions which shape the gradual truth formation, allows us to draw several conclusions. We argue that the interactions that were most frequently and emotionally discussed are the ones, which are most memorable and important to the users. To create more positive user experiences and guide the customer journey towards loyalty and recommendation, the actually truth-forming experiences need to find stronger consideration. An interesting finding is, for example, that privacy in the sense of intrusion – say in form of unprompted activation or fear of permanent eavesdropping – is much more a topic of discussion than the fear that data may be shared with third parties. Hence, CA system developers should prioritize the reduction of intrusion. We also see that the major issues on the negative side relate to the CA not being smoothly integrated into everyday life. In many cases, Alexa does not blend with its environment. It remains a stranger, an entity to which the user has to adapt, which too often does not understand, forgets, misunderstands and overall fails to live up to the high expectations the user had put into it. Our mapping of value qualities can point to the specific areas that merit more consideration. It is worthwhile to use value qualities as an orientation for the future development of CA, because they constitute the individual truth of the customer. The intrusion, which our participant D. described, shaped her perception of being permanently eavesdropped. It is worthy to draw a line back to philosophy at this point, because one may argue that this is not formally true. A formal truth is *"fulfilled when the meaning-content of a judgement (formulated in a proposition) coincides with the facts of a state"* (Scheler et al., 1973, p.189). This is not the case here, D.'s unease about being subject to eavesdropping is in fact not logically, formally true because the device does not eavesdrop. However, in philosophy, there is a significant difference made between formal truth and transcendent truth (von Breisach, 1687). Transcendent truth is different from logic, because it is a truth of being, not a truth of judgement - "*intrinsic to*

being, and does not depend […] on our knowledge" (The Encyclopedia of Diderot & d'Alembert). It is this form of truth, which plays a role in D.'s perception of her CA, because D.'s truth about her technical artefact is constituted based on her experiences, and what she intrinsically makes of them. This reasoning is not necessarily logical or formally true. Considering the relevance of users' transcendent truth, the adequate response by developers is to reduce the type of interactions that fuel such misconceptions, in this case: unsolicited activations.

Our study can contribute to a deeper understanding of the many facets that life with a CA can take on. Perhaps more importantly, our study provides a new perspective on how marketers can extend their view on MoTs to capture the actual, lived experience. Smart environments, particularly when they are enhanced with the presence of CAs, extend the scope of experiences and interactions with the product dramatically. Beyond the mosaic of positive and negative interactions customers make during their journey, sudden event-like ruptures can be of tremendous impact. In the field of information research, our study provides an uncommon perspective to value-centered design, a discipline that often seeks to formulate a set of (human) values, and implement them in technologies as early as during the design process. Our study proposes a thorough analysis of how system dispositions translate into concrete experiences with different value qualities the system provides, and finally contribute to its overall value creation in the personal experience of users over time. This holistic, bottom-up approach is crucial to generate a full picture of gradually evolving user experiences in the natural setting. It can provide the value-centered design community with a way to observe whether purposefully designed system qualities actually materialize in the users' realities, and what role they play in shaping the users' overall personal truths. In the field of CA research, substantiated knowledge has been produced on specific aspects of user-agent relationship, for example on personification and gendering (Purington et al., 2017; Lopatovska and Williams, 2018; Ni Loideain and Adams, 2018) or the specifics of conversation with voice interfaces (Porcheron et al., 2018; Porcheron et al., 2017a). This study contributes to this body of research, a comprehensive overview of different qualitative aspects of user experiences. By considering personal truth formation as a novel understanding of the diversified nature of personal user experiences, we can significantly advance our understanding of the gradually unfolding impact of system dispositions in the users' realities.

5.1 Limitations

The methodology employed in this study was designed to meet quality criteria as rated by CASP Guidelines for qualitative research (CASP UK, 2018). We implemented several techniques to increase the validity and reliability of the findings. However, it is necessary to note that the themes we identified reflect the views of 30 participants. Further research is needed to reliably apply these to a larger group of Amazon Alexa users. We consider the gender bias in the focus groups as a limitation of our current study results and aim for a better balance in our future investigations of the current matter. Our findings are based on the experiences of Austrian, German-speaking Alexa users and was limited to the devices and functions available in Austria as of late 2018. We identified only two manifestations of event-like MoTs and strongly believe that these highly emotion-laden interactions deserve more attention in future research endeavors. Likewise, the underlying value qualities we identified deserve further investigation. Not only can one interaction impact several value qualities at once, value qualities also differ in their importance to different users. Value qualities of essential importance to one user may not even be seen by another (for example, the accessibility a voice interface can generate for a blind person).

5.2 Practical implications

The study of MoTs offers interesting implications for CA design improvement. For example, informing users transparently about potential causes of arbitrary activity before they experience it, could significantly lower the shock and fear they experience. It would certainly strongly benefit the user experience to eliminate the most frequent errors related to functional quality, for example regarding the Alexa App and integration of third party skills.

Many negative interactions seem to be avoidable by providing detailed information about common pitfalls to the users. A simple example could be to inform users that the way they name their playlists, routines and smart objects, has an influence on how easy it is to activate them via voice command. We found that many sorely miss a

comprehensive, easily accessible guide to install the CA, get to know its different functions, and to acquire the appropriate commands. In particular, some participants noted, a CA should be able to *vocally* instruct its users about various functional questions. This would also preserve its inclusiveness for all user groups. Our findings reveal contradictory opinions about unrequested, informative utterances from the CA. While several participants embraced situations in which Alexa explained new functions within the morning routine and explicitly asked for more support, others perceived unnecessary monologues as disturbing, particularly when they reoccurred on a regular basis. A challenge for future developments of CAs lies in the delicate balance of contradictory user interests. We argue that more accessible, transparent and granular control over the type of desired interactions could significantly improve the quality of user experience.

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